Materials Engineering Branch

TIP*

No. 052 Crazing of Polycarbonate by Cyanoacrylates

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Clear molded parts of Lexan (General Electric polycarbonate plastic) have been observed to develop crazing (small cracks) when exposed to Loctite (cyanoacrylate) compounds used to lock screws in place. In some cases the crazing progressed to eventual fracture of the Lexan part. One such occurrence was the subject of Alert No. GT-A-78-01 dated August 8, 1978.

The Loctite compounds are acrylates that cure when air is excluded. Consequently, they may remain fluid for prolonged periods and attack the Lexan if it is under a state of tensile stress. Additionally, an excess of Loctite and slow curing conditions, contribute to the crazing problem.

To prevent the crazing problem in Lexan it is recommended that: (1) cyano-acrylate compounds be avoided, (2) solvents other than ethyl or isopropyl alcohol and hexane be avoided and (3) the Lexan parts be stress relieved by annealing at an elevated temperature, as recommended by General Electric.

In addition to Lexan, other thermoplasts that would be similarly affected by these anaerobic compounds are polystyrenes, ABS, and polymethyl methacrytates. The thermoplasts that are resistant are the Teflons and the polyolefins. However, these must be etched in order to obtain good locking with the locking compound. These acrylate compounds do not affect the thermosetting polymers such as epoxies, phenolics, melamines, etc.

Regardless of the application be aware that Loctite compounds have high outgassing characteristics and are not approved for general space flight use. The reader is encouraged to refer to TIP No.14 for acceptable substitutes.

NOTE: When using anaerobic compounds, a primer is required in the absence of metal.